	c.g.s. units.	
Copper	—	0·7 to 0·8 (Lorenz, &c.).
Brass	0·27	0·25 to 0·3 ,,
Bismuth	—	0·017 ,,
Mercury	—	0·018 Ångström.
Crown glass	0·0024	0·0016 (H. Meyer).
Flint glass	0·0020	0·0014 ,,
Glass	—	0·0021 (Peclet). 0·0005 (G. Forbes).
Rock salt	0·014	0·016 (Tuschmidt).
Quartz along axis	0·030	0·026 (Tuschmidt). 0·001 (G. Forbes).
,, perpendicular to axis	0·016	0·004 ,, 0·016 (Tuschmidt).
Iceland spar along axis	0·010	0·016 ,,
,, perpendicular to axis	0·0084	0·008 ,,
Mica perpendicular to cleavage	0·0016	
White marble	0·0071	0·007 (Peclet). 0·001 (G. Forbes).
Slate	0·0047	0·0008 ,,
Water	—	0·0015 (Winkelmann).
Glycerine	—	0·0007 ,,
Olive oil	—	0·0004 (G. Weber).
Shellac	0·00060	
Paraffin	0·00061	0·0001 (G. Forbes).
Pure rubber	0·00038	0·00009 ,, 0·0005 (Peclet).
Sulphur	0·00045	
Ebonite	0·00040	0·00008 (G. Forbes).
Gutta percha	0·00046	
Paper	0·00031	
Asbestos paper	0·0006	
Mahogany	0·00047	
Walnut	0·00036	
Cork	0·00013	
Silk	0·00022	
Cotton	0·00055	
Flannel	0·00023	

IV. "On the Mechanical Stretching of Liquids: an Experimental Determination of the Volume-Extensibility of Ethyl Alcohol." By A. M. WORTHINGTON, M.A. Communicated by Professor POYNTING, F.R.S. Received February 1, 1892.

(Abstract.)

After adverting to the three known methods of subjecting a liquid to tension, viz., (i) the method of the inverted barometer, (ii) the

centrifugal method devised by Osborne Reynolds, (iii) the method of cooling discovered in 1850 by Berthelot, and pointing out that the first two afford means of measuring stress but not strain, while the third gives a measure of strain but not stress, the author proceeds to describe the manner in which he had used the method of Berthelot in combination with a new mode of determining the stress, and had succeeded in obtaining simultaneous measures of tensile stress and strain for ethyl alcohol up to a tension of more than 17 atmospheres, or 255 lbs. per square inch.

The liquid, deprived of air by prolonged boiling, is sealed in a strong glass vessel, which it almost fills at a particular temperature, the residual space being occupied only by vapour. On raising the temperature, the liquid expands and fills the whole. On now lowering the temperature, the liquid is prevented from contracting by its adhesion to the walls of the vessels, and remains distended, still filling the whole and exerting an inward pull on the walls of the vessel. The tension exerted is measured by means of the change in capacity of the ellipsoidal bulb of a thermometer sealed into the vessel and called the "tonometer." This bulb becomes slightly more spherical, and therefore more capacious, under the pull of the liquid, and the mercury in the tonometer stem falls. The tension corresponding to the fall is previously determined from observation of the rise produced by an equal pressure applied over the same surface.

The liquid is caused at any desired instant to let go its hold and spring back to the unstretched volume corresponding to its temperature and to its saturated vapour-pressure by heating for a moment, by means of an electric current, a fine platinum wire passing transversely through the capillary tube that forms part of the vessel. The space left vacant in the tube represents the *apparent* extension uncorrected for the yielding of the glass vessel.

The measures obtained show that, within the limits of observational error, the stress and this appparent strain are proportional up to the highest tension reached (17 atmospheres) ; but, since the small yielding of the nearly rigid glass vessel must itself be proportional to the stress, it follows that the stress and absolute strain are proportional.

By subjecting the liquid to a pressure of 12 atmospheres *in the same vessel*, it was found that the apparent compressibility was the same as the apparent extensibility, whence it is deduced that between pressures of $+12$ and -17 atmospheres the absolute coefficient of elasticity is, within the limits of observational error, constant. Its actual value is best obtained by observations of compressibility.

The paper concludes with a description and explanation of a peculiar phenomenon of adhesion between two solids in contact when immersed in a liquid that is subjected to tension.